ABSTRACTS OF BOTANICAL PAPERS READ AT THE DETROIT MEETING OF THE A. A. A. S.

THE following papers were presented before Section G, and in most cases the abstracts are those prepared by the author. The vice presidential address of Professor George F. Atkinson, entitled "Experimental morphology," is published in full elsewhere.

CHARLES A. DAVIS; *Trillium grandiflorum* (Michx.) Salisb.; *its variations normal and teratological.*—The variations are largely of a type common to most species of plants, in the shapes of leaves, petals, and sepals, and in the varying length of petioles. In several hundred abnormal specimens the simplest departure was marked by the presence of green stripes in the petals. This striping was accompanied by lengthening of the petioles and degeneration of the pistil. About fifty specimens were studied in which the leaves had either entirely disappeared or were reduced to bracts. In such forms the stamens are the most stable of the organs of the flower, only a few reversions to the leaf type occurring, while the pistil was usually sterile, rarely containing ovules, frequently being reduced to the leaf form, and sometimes containing well marked whorls of leaves. The petals of this form were usually nearly all green. Variations from the normal form of rootstock, and in the number of parts in each whorl of the plant to two and four, were also noted.

E. J. DURAND: *A discussion of the structural characters of the order Pezizineæ of Schroeter.*—Read by title.

K. M. WIEGAND: *The taxonomic value of fruit characters in the genus Galium.*—In certain species of Galium the fruit is saucer shaped, in other closely related species cup shaped, and in others the edge of the cup is so constructed as to leave but a pore connecting the hollow interior with the exterior.

CHARLES E. BESSEY: *Report upon the progress of the botanical survey of Nebraska.*—The survey was organized in 1892 by the Botanical Seminar of the University of Nebraska, since which time it has brought together more than 10,000 specimens; published "Reports I, II, III, and IV;" and published Parts I, II, and XXI of the *Flora of Nebraska*. The total number of species known to the state is about 3400.

ALBERT F. WOODS: *Bacteriosis of carnations.*—This disease is not due to a bacterial disease, as has been supposed, but to the punctures of aphides and thrips. The cells affected become œdemic, collapse, and give a whitish sunken spot. The dead tissue may subsequently become infested by bacteria and fungi. (Published in full in this number.)

ERWIN F. SMITH: *Wakker's hyacinth bacterium.*—Diseased bulbs were procured in 1896 from the Netherlands, and the whole subject has been re-examined. The micro-organism described by Dr. Wakker in 1883 as *Bacterium hyacinthi* is the true cause of the disease, and is quite unlike that subsequently isolated from rotting hyacinth and described by Dr. Heinz as *Bacillus hyacinthi septici*. Successful inoculations have been obtained from pure cultures, and much new information has been gathered respecting the relationships of the organism and its behavior in a variety of culture media.

CHARLES E. BESSEY: *Are the trees receding from the Nebraska plains?*—None are known to be receding, while several species, such as the bur oak and the pines are advancing.

C. A. PETERS: *Reproductive organs and embryology of Drosera.*—A detailed account of the structure and development of pollen and ovule, the former differing in some particulars from that of most dicotyledons.

J. O. SCHLOTTERBECK: *Development of some seed coats.*—The appendage to the seed of *Melampyrum pratense* is not a strophiole, nor a caruncle, nor an arillus, each of which has been claimed, but is a part of the endosperm which becomes constricted off from the rest during development. A study of the development of the seed of *Croton Tiglium* shows that its nucellus protrudes far

out of the micropyle, the only similar case known being that of *Croton flavens*.

J. H. SCHUETTE: *Contributions on wild and cultivated roses of Wisconsin and bordering states*.—Read in abstract.

FANNY E. LANGDON: *Development of the pollen of Asclepias Cornuti*.—In this study the order of cell formation has been verified by nuclear figures, thus removing all doubt with regard to successive changes. The order of development differs from the account given by Corry, the only previous writer, in the following particulars: (1) the archesporium, as in most dicotyledons, is composed of a layer of cells, and not of a single column of cells, as stated by Corry; (2) the tapetum from an early stage is composed of two to several layers, instead of a single layer; (3) Corry states that the wall of the tapetum next to the pollen becomes chitinous, and that this changed wall forms the outer wall of the pollinia, while the latter is found by the present writer to be derived in part from a secretion from the tapetum and in part from the changed outer walls of the pollen cells. The cells of the tapetum undergo remarkable changes during the development of the pollen, and probably function as glandular tissue, manufacturing a secretion which is to serve as protection to the pollen, rather than "breaking down."

CHARLES E. BESSEY: *Some characteristics of the foothill vegetation of western Nebraska*.—The foothill region is an elevated plain 1200 meters above sea level, upon which are Pine ridge on the north, 1500 meters above sea level, and Cheyenne ridge on the south, 1700 meters above sea level. Upon Cheyenne ridge occur considerable bodies of trees, mostly pines, with red cedar, box elder, and others. The Box butte plains are covered with a uniform grass formation.

H. F. OSBORN and E. B. POULTON: *Organic selection*.—Suggestions regarding the harmonizing of Darwinism and Lamarckism proposed by Professor Osborn were criticised by Professor Poulton.

JAMES B. POLLOCK: *Mechanism of root curvature*.—From experiments continued during two years it is held to be demon-

strated that the stimulus, in response to which curvature takes place, is transmitted in the cortex, either of the convex or concave side, and that the root in curving takes advantage of tensions already existing. In an unstimulated root the tissue tensions are such that every side tends to curve the root away from that side. These tendencies balance each other and the root grows straight. When the root is stimulated (as by wounding one side of the tip) an impulse is transmitted along the cortex as far as the curvature extends. The impulse produces on the side farthest from the wound a change in the protoplasm of the cortical parenchyma which makes it more permeable to water. The elasticity of the cell walls forces water out of the cells into the intercellular spaces. This shortens the cells of that side. At the same time the stimulus causes an extension, probably a growth, of the cells on the side that becomes convex. Both sides of the roots are active in producing the curvature, but their activities are of a different kind. The axial cylinder remains neutral and curvature necessarily follows.

FREDERICK C. NEWCOMBE: *Cellulose ferment.*—Account of the action of a cellulose dissolving enzyme extracted from cotyledons of seedlings of *Lupinus albus*.

RODNEY H. TRUE and C. G. HUNKEL: *The toxic action of phenols on plants.*—A study of the toxic action of phenols on living plants shows that they act less sharply and less severely than acids and heavy metals. Electrolytic dissociation plays a much less active rôle, generally speaking, than is the case in those classes of compounds, the toxic effect being due in the main to the undissociated molecules. Various radicals, when introduced into the molecule, exert a specific effect. The number of OH groups present, from one to three, does not directly affect the toxic action of phenols. The introduction of an OCH_3 group does not increase the toxic action of phenols. The introduction of one or more NO_2 groups, the substitution of a CH_3 group for an OH group, the presence of a C_3H_7 group or a COOH group, all increase in some measure the toxic action of the substance It seems certain that when plants are raised under constant con-

ditions their protoplasm with much constancy gives results which depend on the nature of the solution used, and stand in direct relation to its chemical composition.

CHARLES PORTER HART: *Is the characteristic acridity of certain species of the arum family a mechanical or a physiological property or effect?*—Preparations of the extracted juice of arum that have been filtered still preserve their acridity and produce remarkable physiological effects.

W. J. BEAL: *How plants flee from their enemies.*—It is found impossible in many cases to maintain beds of a given species for any considerable length of time in the place where they were originally set on account of various enemies from which the plants either slowly or rapidly withdraw. Water plants also exhibit peculiar habits in this respect. *Marsilia quadrifolia* has been observed to grow at different levels and in different ways, following changed external conditions.

ALEX. P. ANDERSON: *Stomata on the bud scales of Abies pectinata.*—Heretofore stomata have been thought never to occur on the bud scales of gymnosperms. They are now found on those of the species named.

ALEX. P. ANDERSON: *Comparative anatomy of the normal and diseased organs of Abies balsamea affected with Æcidium elatinum.*—Comparison shows differences in structure of leaves of the lateral and erect branches; the presence of two to six resin canals in the diseased bud scales, from which the resin, exuding through fringing hairs, spreads in a layer 1 to 3^{mm} thick over the scale; and the formation of resin vesicles in the primary cortex by the growth of the epithelial lining to the resin canals.

ALEX. P. ANDERSON: *On a new and improved self-registering balance.*

CHARLES O. TOWNSEND: *The correlation of growth under the influence of injuries.*—The purpose of the experiments conducted by the writer was to determine in what time, through what distance, and to what extent an injury inflicted upon one part of a plant will influence the growth of the injured and also of the uninjured parts. Seedlings were chiefly employed, but older

plants were used to some extent, as was also *Phycomyces nitens*. The flowering plants were injured by removing the roots as a whole or in part, or by splitting the roots near the base or near the tip; or the shoots or leaves were removed as a whole or in part. Specimens of Phycomyces were injured either by cutting away a mycelium or by removing one of the two or more sporangium stalks. In the case of the higher plants a gradual change in the rate of growth took place, and became marked in from six to twenty-four hours after injury. The influence of the irritation extended through a distance of from 0 to 300^{mm}, although this is by no means considered to be the limit through which the influence of injury is capable of acting. The change in rate of growth after injury varied from 0 to 80 per cent. of the normal rate. In the case of Phycomyces the rate of growth was reduced immediately after injury, and recovered its normal rate in from thirty to sixty minutes. In no case examined did the growth entirely cease.

W. W. ROWLEE and K. M. WIEGAND: *The botanical collection of the Cornell Arctic Expedition of 1896.*—Read by title.

ERWIN F. SMITH: *Description of* **Bacillus phaseoli,** n. sp.—*Bacillus phaseoli* is a short rod with rounded ends, yellow on various media, motile in early stages of growth, and decidedly pathogenic to beans and some related legumes, causing water-soaked spots on the pods. Its thermal death point (ten minutes exposure) is approximately 49° C., and it will not grow in the closed end of the fermentation tube with any of the common sugars. This organism is closely related to *Bacterium hyacinthi* Wakker and *Bacillus campestris* Pammel, two other motile yellow germs. It has been under observation in pure cultures for about thirteen months, and there is no doubt whatever as to its parasitic nature, all of Koch's canons for determining this point having been complied with. The three organisms here mentioned were compared and contrasted, and cultures of each exhibited, also photographs, paintings, and dried specimens.

ERWIN F. SMITH: *On the nature of certain pigments produced by fungi and bacteria, with special reference to that produced by*

Bacillus solanacearum.—The dark brown pigment produced by the potato rot bacillus will not dialyze, or does so only very imperfectly, and is precipitated by compounds of calcium and of iron. It was suggested as a working hypothesis that the humus compounds of the soil are due solely to the chemical action of fungi and bacteria on the carbohydrate materials of animals and plants, especially the latter.